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LEARNING
POTENTIAL

Level 3 Alternative Academic Qualification (Applied Qualification) in

MEDICAL SCIENCE

(Extended Certificate)

Teaching from 2025 | Award from 2027

Version 2: November 2024

SPECIFICATION

Qualification Information

Qualification Title	**WJEC Level 3 Alternative Academic Qualification (Applied Qualification) in Medical Science (Extended Certificate)**
Qualification Objective	To prepare learners to progress to a qualification in the same/similar subject area at a higher level.
WJEC Qualification Code	4403QX
Ofqual QN	610/3048/X
QiW Number	
Age groups approved for	16-18, 19+
First teaching	2025
First certification	2027
Key documentation	Sample Assessment Materials Assessment Packs Guidance for Teaching Administration Guide

Version	Description	Date
1	First version	June 2024
2	Guidance updated for clarity	November 2024
Our specifications may change over time. WJEC will inform centres of any amendments and the most up to date version of the specification will always be on the website		

Contents

1. Why choose us?

We are one the largest providers of qualifications for schools, academies, sixth form and further education colleges across England, Wales and Northern Ireland, offering valued qualifications to suit a range of abilities.

Everything we do is focused on providing you and your learners with the opportunities and tools you need for success.

Your learners will benefit from our accessible approach to assessment, while our comprehensive package of subject support, resources and training will help you teach with confidence.

Accessible, reliable assessment
Our accessible approach to assessment offers learners every opportunity to succeed by demonstrating their skills, knowledge and understanding.

Easy access to specialist subject support
Getting help from your exam board shouldn't be a challenge. As well as being subject experts, our subject officers are former teachers who understand the issues you face in the classroom.

Free high-quality teaching resources
Our free online teaching resources are designed by an expert team to guide both teachers and learners through our specifications.

Expert-led training opportunities
We'll provide you with all the training you need to deliver our qualifications with confidence.

Learn more at our websites:
- www.eduqas.co.uk
- www.wjec.co.uk

2. Qualification Overview

2.1. Sector overview

Medical science is dedicated to understanding the human body, diagnosing diseases, developing treatments, and promoting overall health. It integrates various scientific disciplines to study the structure and function of the body, the mechanisms of diseases, and the ways to prevent and cure health issues.

Medical scientists are at the forefront of healthcare services, as they are vital in the diagnosis of disease, determining the effectiveness of treatments and searching for new cures. They are involved in a broad range of activities, from basic research in laboratories to clinical trials and direct patient care, all aimed at understanding health and combating disease.

2.2. Who is this qualification for?

The WJEC Level 3 Alternative Academic Qualification (Applied Qualification) in Medical Science (Extended Certificate) is primarily designed for learners aged 16-19 who are intending to progress to higher education and pursue graduate careers related to healthcare and medical research.

2.3. Prior learning requirements

There are no prior learning requirements for this specification. Any requirements set for entry to a course following this specification are at the discretion of centres.

Learners interested in this qualification will most likely have already enjoyed and been successful in science. Typically, learners starting this qualification will already have science qualifications at level 2, e.g. GCSEs in science subjects.

2.4. Qualification Structure

This qualification develops learners' knowledge, understanding and skills in key scientific principles to support progression to higher education. The qualification covers the key topic areas of health, physiology and disease, as well as providing the opportunity to study the areas of pharmacology, physiological measurement techniques, clinical testing and medical research.

All learners complete six mandatory units:

Unit	GLH	Assessment
Human health and disease	90	External
Physiological measurement techniques	45	Internal
Medical Science research methods	45	Internal
Medicines and treatment of disease	70	Internal
Clinical laboratory techniques	60	External
Medical case study	50	External

2.5. Qualification size

The size of the WJEC Level 3 Alternative Academic Qualification (Applied Qualification) in Medical Science (Extended Certificate) is expressed in terms of guided learning hours and total qualification time.

Guided learning hours (GLH) means activities such as classroom-based learning, tutorials and online learning, which are directly supervised by a teacher, tutor or invigilator. It also includes all forms of assessment which take place under the immediate guidance or supervision of a teacher, supervisor or invigilator.

Guided learning hours are allocated per unit to support centre planning and delivery. Teachers may choose to deliver parts or all of this qualification holistically and, therefore, guided learning hours per unit are provided as a recommendation only.

Total qualification time (TQT) is the total amount of time, in hours, expected to be spent by a learner to achieve a qualification. It includes both the guided learning hours and/or supervised assessment (GLH) and additional time spent in preparation, study and some formative assessment activities.

The GLH and TQT assigned to this qualification is:

GLH	TQT
360	540

2.6. Related qualifications

A Level 3 Applied Qualification in Medical Science (Certificate) is also available. This is 180glh, half the size of the WJEC Level 3 Alternative Academic Qualification (Applied Qualification) in Medical Science (Extended Certificate).

The Level 3 Applied Qualification in Medical Science (Certificate) has **not** been approved as an Alternative Academic Qualification (AAQ).

3. Summary of assessment

Unit 1: Human health and disease
Written examination: Time of exam – 2 hours

25% of qualification
90 marks

This examination will consist of two sections. All questions are compulsory.

Section A - Questions will be based upon a pre-release article and connected specification content.

Section B - Questions will be set within a health context. All questions will require the learner to engage with stimulus material. Stimulus material may include images, diagrams, photographs, graphs and information.

Unit 2: Physiological measurement techniques
Non-examination assessment: 6 hours 30 minutes

12.5% of qualification
80 marks

The assessment will include a scenario and several tasks to assess the learner's knowledge, understanding and skills in relation to physiological measurement techniques.

The assessment will be available via the WJEC Portal and will remain the same for the lifetime of the specification.

Unit 3: Medical Science research methods
Non-examination assessment: 5 hours + 10 days for data collection

12.5% of qualification
80 marks

The assessment will include a scenario and several tasks to assess the learner's knowledge, understanding and skills in relation to medical science research methods.

The assessment will be available via the Portal and will remain the same for the lifetime of the specification.

Unit 4: Medicines and treatment of disease
Non-examination assessment: 8 hours

20% of qualification
80 marks

The assessment will include a scenario and several tasks to assess the learner's knowledge, understanding and skills in relation to medicines and treatment of disease.

The assessment will be available via the WJEC Portal and will remain the same for the lifetime of the specification.

Unit 5: Clinical laboratory techniques
Non-examination assessment: 7 hours

15% of qualification
75 marks

The assessment will include a scenario and several tasks to assess the learner's knowledge, understanding and skills in relation to clinical laboratory techniques

The assessment will be released **annually** by WJEC via the WJEC Portal.

Unit 6: Medical case study (synoptic)
Written examination: Time of exam – 2 hours

15% of qualification
90 marks

The examination will consist of questions based upon three different case studies.

The case studies will provide a medical context for questions in the examination paper and will change each year. The case studies will require candidates to integrate the knowledge, understanding and skills developed through units 1 to 5.

4. Units

4.1. Our unit format

Unit information is presented in a consistent format as shown below.

Section	Description
Unit title	This provides the full title of the unit.
Guided learning hours (GLH):	This provides guidance on the number of guided learning hours that will be required to deliver the unit. Guided learning means activities such as classroom-based learning, tutorials and online learning, which is directly supervised by a teacher, tutor or invigilator. It also includes all forms of assessment which take place under the immediate guidance or supervision of a teacher, supervisor or invigilator. GLH is provided per unit to support delivery. Teachers may choose to deliver this qualification holistically and, therefore, hours per unit are a recommendation only.
Mandatory/Optional	This identifies if the unit is optional or mandatory.
Context:	This sets the vocational context for the unit, i.e., why is it important that the learner gains the knowledge, understanding and skills delivered through this unit.
Overview of unit:	This provides a summary of the knowledge, understanding and skills that the learners will acquire through completing the unit.
Topics:	This provides the list of topics areas covered in the unit.
Summary of assessment:	This summarises the assessment arrangements for the unit, , including whether the unit is internally (centre) assessed or externally assessed.
Content (sections and amplification)	This sets out the required teaching for the unit. Content for each topic is sub-divided into sections. Amplification for each section, provided in the right-hand column, includes content that must be taught. There is no hierarchy implied by the order in which the content is presented, and the order does not imply a prescribed teaching order.

4.2. How to read the amplification

The amplification provided in the right-hand column uses the following four stems:

- 'Learners should know' is used when learners are required to use direct recall.
- 'Learners should be aware of' is used when learners do not need to understand all aspects of the specified content in detail.
- 'Learners should understand' is used when learners are required to demonstrate greater depth than straight identification or recall, for example, they can apply knowledge to familiar or unfamiliar contexts and can synthesise and evaluate information for a given purpose.

- 'Learners should be able to' has been used when learners need to apply their knowledge and understanding to a practical situation or demonstrate application of practical skills and techniques.

The use of the word 'including' indicates that the specified content must be taught and could be subject to assessment.

The use of the words 'for example' or 'such as' indicates that the specified content is for guidance only, and alternative examples could be chosen.

Teachers should refer to guidance for teaching documents for further guidance on the depth and breadth to which this content should be taught.

Unit 1

Unit title	Human health and disease
GLH	90
Context	Health professionals and scientists working in the healthcare sector need to understand the anatomy and physiology of the human body. An understanding of how physiological systems work under normal circumstances is fundamental to maintain good health and wellbeing. This understanding is also crucial to enable treatment of individuals when injury or disease occurs. There are a huge number of healthcare professionals that deliver care and treatment to a diverse range of service users. Scientists also work in the healthcare sector, as well as in universities, government agencies and in the pharmaceutical and bioscience industries.

Some of the features and characteristics of healthcare professionals and medical scientists such as meeting deadlines, attention to detail, methodical approach and analytical thinking are important transferable skills, applicable in all aspects of life and work. They must have good communication skills as liaison with people who use healthcare services, other scientists and healthcare workers, and other agencies is often necessary.

This unit is designed to help learners understand the ways that healthcare professionals and scientists involved within the medical sector work so that they will be able to tackle problems and answer questions in a medical context. This will involve examining the key principles that underlie the functioning of our body systems, how they are maintained and how problems can arise. |

Overview of unit	This unit develops knowledge and understanding of human anatomy and physiology. The unit will develop an understanding of the function of organ systems and some problems that can occur in these systems. The unit will enable learners to understand the normal functioning of the body at a cellular and physiological system level. They will learn how these systems react in different situations, and how these systems can go wrong in order to report on health of individuals.
Topics	1.1 Understanding biological principles 1.2 Understanding the function of human physiological systems 1.3 Understanding how external factors impact on the body 1.4 Reporting on human health
Summary of assessment	This unit is externally assessed through a written examination available in May/June each year. The external assessment will: ● be set and marked by WJEC ● consist of a 2 hour paper ● assess content from each topic in the unit each series ● include 90 marks ● include a balance of short and extended answer questions, based on stimulus material and applied contexts ● only use the command words listed in the Assessment Guide ● be graded a-e. Each paper will consist of two sections (Section A and B). All questions in both sections will be compulsory. Section A ● Questions will be based upon a pre-release article and connected specification content. ● The pre-release article is intended to provide a medical context for questions in section A. It will also contain medical data and information for analysis and/or evaluation. ● Between 22 and 25 marks will be available for Section A.

	Section B
	• Questions will be set within a health context. All questions will require the learner to engage with stimulus material. Stimulus material may include images, diagrams, photographs, graphs and information. • All content in each topic area will be assessed over the lifespan of the specification. WJEC will produce a mark scheme which will be used as the basis for marking the examination papers. • The pre-release article will be available for centres to download from the WJEC website 4 weeks before the exam. Teachers can use the pre-release material in lessons with learners after it has been released. Learners will be issued with a clean copy of the pre-release article for the examination. Learners **are not** permitted to take an annotated copy of the pre-release article into the examination.

1.1 Understanding biological principles

In this topic learners will gain knowledge and understanding of the following areas:

1.1.1 The function of main classes of biological molecules in humans

1.1.2 The structure of human cells

1.1.3 Transport systems in cells

1.1.4 How cells process information

Content

Section	Amplification

1.1.1
 	
The function of main classes of biological molecules in humans
	Learners should understand the following classes of biological molecules:
	• carbohydrates
	  • monosaccharides, disaccharides, polysaccharides
	• lipids
	  • triglycerides, phospholipids, steroids
	• proteins and enzymes
	  • mechanisms of action (lock and key, induced fit)
	  • factors affecting enzyme reactions (temperature, pH, substrate concentration, enzyme concentration, inhibitors)
	• nucleotides
	  • ATP
	• nucleic acids
	  • DNA
	  • RNA.

1.1.2 The structure of human cells	Learners should understand the human cellular structure: • plasma membrane • nucleus • nucleolus • endoplasmic reticulum • golgi apparatus • mitochondria • nuclear envelope.

1.1.3 Transport systems in cells	Learners should understand the movement into and out of cells: • simple diffusion • osmosis • facilitated diffusion • active transport • endo/exocytosis • visking tubing as a model of living material.
1.1.4 How cells process information	Learners should understand DNA mechanisms: • semi conservative replication • transcription • translation • 'one gene one protein' hypothesis • triplet code.

1.2 Understanding the function of human physiological systems

In this topic learners will gain knowledge and understanding of the following areas:

1.2.1 The structure of human physiological systems

1.2.2 The function of human physiological systems

Section	Amplification
1.2.1 The structure of human physiological systems	Learners should understand the structure of the following human physiological systems: Endocrine system: • pancreas, pituitary, kidney. Nervous system: • CNS • PNS. Musculoskeletal system: • spinal column, joints, muscles. Digestive system: • mouth, oesophagus, stomach, pancreas, liver, duodenum, ileum, colon. Cardiovascular system: • blood vessels: • arteries, veins, capillaries • heart: • coronary arteries, chambers, aorta, pulmonary artery, vena cava, pulmonary vein, cardiac muscle, valves • blood: • plasma, thrombocytes, erythrocytes, leucocytes, blood groups. Respiratory system: • lung, trachea, bronchi, bronchioles, alveoli, pleural membranes, ribs, diaphragm. Immune system: • white blood cells • antibodies • basic complement system.

1.2.2 The function of human physiological systems	Learners should understand the function of the following human physiological systems: Endocrine System: - purpose of system - role of the pancreas - action of insulin, action of glucagon - role of the kidney - action of ADH. Nervous system: - purpose of system - voluntary and involuntary responses. Musculoskeletal system: - purpose of system - sliding filament theory. Digestive system: - purpose of system - chemical digestion - mechanical digestion - bile production - glucose metabolism - absorption. Cardiovascular system: - purpose of system - control of heartbeat. Respiratory system: - purpose of system - control of breathing - role of pulmonary surfactant. Immune system: - purpose of system - action of vaccines.

1.3 Understanding how external factors impact on the body

In this topic learners will gain knowledge and understanding of the following areas:
1.3.1 How lifestyle may affect major body systems
1.3.2 How lifestyle may impact health
1.3.3 How pathogens can affect body systems
1.3.4 How non-infectious diseases affect body systems

Section	Amplification
1.3.1 How lifestyle may affect major body systems	Learners should understand: Physiological effects: • coronary heart disease • diabetes • nutrient deficiencies • obesity • alcohol/drug dependency • lung disease. Psychological effects: • stress • depression and other mental health conditions/illnesses.
1.3.2 How lifestyle may impact health	Learners should understand how lifestyle may impact health, for example: • diet, alcohol and recreational drugs • smoking and vaping • exercise/physical activity • housing • type of employment.
1.3.3 How pathogens can affect body systems	Learners should understand how the following pathogens can affect body systems: • viruses • bacteria • protozoa • fungi • worms • prions.
1.3.4 How non-infectious conditions affect body systems	Learners should understand how the following non-infectious conditions affect body systems: • allergies • autoimmune diseases • inherited diseases e.g. dominant, recessive and sex-linked.

1.4 Reporting on human health

In this topic learners will gain knowledge and understanding of the following areas:
1.4.1 Analysing data
1.4.2 Processing data
1.4.3 Making evidence based conclusions
1.4.4 Creating a report on health

Section	Amplification
1.4.1 Analysing data	Learners should be able to analyse the following types of data: Qualitative: • e.g. interviews, observation, diaries Quantitative: • physiological methods.
1.4.2 Processing data	Learners should be able to process and present data in the following ways: Graphical methods: • scatter diagrams, line graphs, trend lines • bar charts Calculations: • expressions in decimal and standard form • interchange ratios, fractions and percentages • find arithmetic means • make order of magnitude calculations • substitute numerical values into algebraic equations and solve them using appropriate units for physical quantities • translate information between graphical and numeric form • determine the slope of a linear graph. Learners should be able to use significant figures: • expressing information to the appropriate number of significant figures.
1.4.3 Making evidence based conclusions	Learners should be able to make evidence based conclusions by: • comparing data • linking ideas • stating uncertainty in conclusions.

1.4.4 Creating a report on health	Learners should understand: Communication: • language style and accuracy. Language: • spelling, grammar, structure. Style: • formal, informal • appropriateness for audience. Audience: • individual • technical, non-technical.

Unit 2

Unit title	Physiological measurement techniques
GLH	45
Context	Physiological measurements play a very important role in the diagnosis and treatment of patients in a range of clinical settings. What simple clinical measurements can be carried out? How are complex measurements carried out? How do we know what measurement to select? When physiological measurements are carried out - such as measuring temperature, pulse rate or respiration rate – healthcare professionals are monitoring for signs of abnormality (i.e. anything that falls outside of the 'normal' range). Health professionals will then be able to draw conclusions about the health status of the individual and evaluate any treatments they may require. Most healthcare scientists involved with physiological measurement work in hospital clinics and departments or as part of surgical teams. This unit is designed to help learners understand how healthcare scientists who work in physiological sciences, investigate the function of body systems by undertaking physiological measurements. This involves using specialist equipment, advanced technologies and a range of different procedures.
Overview of unit	This unit develops knowledge and understanding about the physiological measurements that can be made to assess the function of major body systems. It relates anatomy and physiology to physiological measurement test results, through an understanding of the principles of the measurement techniques. The unit will enable learners to perform tests which will accurately measure a range of physiological functions. They will be able to interpret the results of these tests and other tests and link this to possible physiological disorders.
Topics	2.1 The function of physiological measurement tests 2.2 How to deal with patients 2.3 Carrying out physiological measurement tests 2.4 Reporting on physiological measurement testing

Summary of assessment	This unit is internally assessed through a non-examination assessment. Learners will undertake a series of set tasks that are to be applied to a prescribed context set by WJEC and issued to centres via the WJEC Portal. This will remain for the lifetime of the specification.
	The non-examination assessment will:
	• be marked by the centre and moderated by WJEC
	• consist of 6 hours 30 minutes
	• assess content from each topic and each section in the unit
	• include 80 marks
	• only use the command words listed in the Assessment Guide
	• be graded a-e.

2.1 The function of physiological measurement tests

In this topic learners will gain knowledge and understanding of the following areas:

2.1.1 Principles of physiological measurement tests

2.1.2 Significance of data obtained from physiological measurements

2.1.3 Limitations of physiological measurement testing

Content

Section	Amplification
2.1.1 Principles of physiological measurement tests	Learners should understand the principles (how the test works) of the following physiological measurement tests: • cardiac physiology (e.g. electrocardiograms (ECG): ambulatory and stress, echocardiography, exercise tolerance testing, blood pressure) • respiratory physiology (e.g. respiratory rate, peak expiratory flow, spirometry, oximetry) • neurophysiology (e.g. nerve conduction studies, electromyography, electroencephalography, evoked potentials) • audiology (otoscopic examination, pure tone audiometry, tympanometry, tuning fork tests) • GI physiology (endoscopy, measurement of muscle and sphincter function) • ophthalmic physiology (ophthalmic imaging, intra-ocular pressure measurements) • urodynamics (free flow rate, cystometry) • vascular function (scans: carotid, peripheral arterial, peripheral venous).

2.1.2 Significance of data obtained from physiological measurements	Learners should understand the significance of data obtained from physiological measurements including: • normal range • outside normal range • indicators of disease/disorders. Examples: • cardiovascular disease such as coronary heart disease, congenital heart disease, arrhythmias • hearing impairment/loss • eye disease, vision disorders • conditions affecting the central and peripheral nervous system • conditions affecting upper and lower GI tract • conditions affecting bladder and lower urinary tract function • conditions affecting arteries and veins e.g. DVT.
2.1.3 Limitations of physiological measurement testing	Learners should understand the limitations of physiological measurements including: • precision & accuracy • artefacts • sensitivity • measurement errors.

2.2 How to deal with patients

In this topic learners will gain knowledge and understanding of the following areas:
2.2.1 The importance of patient confidentiality
2.2.2 Conduct towards patients

Content

Section	Amplification
2.2.1 The importance of patient confidentiality	Learners should understand the importance of patient confidentiality including: • codes of practice (e.g. NHS code of practice) • protect information, inform, provide • disclosure of information.
2.2.2 Conduct towards patients	Learners should understand appropriate conduct towards patients including: • empathy • tone • use of language.

2.3 Carrying out physiological measurement tests
In this topic learners will gain knowledge and understanding of the following areas: 2.3.1 Planning to perform physiological measurement tests 2.3.2 Using physiological testing equipment 2.3.3 Recording results from physiological measurement tests

Content	
Section	**Amplification**
2.3.1 Planning to perform physiological measurement tests	Learners should be able to consider: Key aspects of a plan: • identifies information to collect • procedures and equipment • location • timing • informing individuals. Procedures and equipment: • identifies procedures • informs technician of required equipment and times. Informing individuals: • patients • other personnel affected (e.g. facilities).
2.3.2 Using physiological testing equipment	Learners should be able to select and use appropriate physiological testing equipment, such as: • equipment for respiratory testing (e.g., peak flow meter, spirometry) • equipment for hearing tests (e.g., otoscope, pure tone audiometer, tympanometer) • equipment for ophthalmic tests (e.g., visual acuity, field of vision and colour vision) • cardiovascular equipment (e.g., electrocardiogram-ECG, echocardiography (Echo), blood pressure monitor, pulse oximeter).
2.3.3 Recording results from physiological measurement tests	Learners should be able to use the following documentation: • laboratory notebook • proforma • healthcare learning management systems/database records. Learners should be able to ensure that the records made have: • all the information recorded • precision of recorded data • legible entries.

2.4 Reporting on physiological measurement tests

In this topic learners will gain knowledge and understanding of the following areas:

2.4.1 Processing data from physiological measurement tests

2.4.2 Making evidence based conclusions about the "health" of individuals

2.4.3 Evaluating the reliability of data from physiological measurement tests

2.4.4 Communicating in writing

Content

Section	Amplification
2.4.1 Processing data from physiological measurement tests	Learners should be able to process: • primary data • secondary data. Learners should be able to process data using appropriate calculations.
2.4.2 Making evidence based conclusions about the "health" of individuals	Learners should be able to undertake: • comparison of data to expected norms, considering age, gender, ethnicity • comparison of data to previous test results: patient history. Learners should be able to: • link findings to expected physiology and possible pathology • state any uncertainty in conclusions.
2.4.3 Evaluating the reliability of data from physiological measurement tests	Learners should be able to evaluate: • validity of data • presence of artefacts • variables affecting data.
2.4.4 Communicating in writing	Learners should be able to communicate in writing using: • technical and scientific language • accurate spelling, punctuation and grammar • clarity • relevant material • a structured form of communication. Learners should be able to communicate in writing to the following audiences: • medical and healthcare colleagues • patients • other relevant stakeholders. Learners should be able to use an appropriate style of language including: • scientific and technical • semi technical, non-technical • illustrations.

Unit 3

Unit title	Medical Science research methods
GLH	45
Context	How can we find out if lifestyle affects health? How has medical science research been carried out to show that MMR is not connected to autism? Is there a meaningful connection between alcohol consumption and life expectancy? How could research be carried out to find if eating 'five-a-day' of fruit and vegetables is linked to good health? How can we improve the way in which ulcers are managed in hospital? Are sedentary children more likely to get ME? Why do people start smoking? Medical research methods are intended to help answer questions like the ones outlined above. Real-life studies can be complex because of the many variables that need to be taken into account and controlled. This unit is designed to help learners think through the issues involved in research so that we can have confidence in the conclusions that have been made. In this unit, learners will be introduced to the methods of scientific enquiry which are used to answer questions such as those proposed above. The unit has been designed to develop learners' knowledge and understanding of planning, conducting, analysing and reporting research in medical sciences. It will do this by introducing learners to a range of methodologies and techniques that are used. It will also encourage the acquisition of a range of evaluative concepts for reviewing and discussing the design and outcome of research. All of this will be done through a hands-on approach where learners will plan and collect information to answer questions connected to medical science.

Overview of unit	This unit develops knowledge and understanding of planning, conducting and reporting of research in medical sciences using a range of methodologies and techniques. It is intended to enable the acquisition of the necessary knowledge and skills to carry out research in order to obtain meaningful information.
	It also seeks to promote an understanding of the processes involved in drawing meaningful inferences from research data.
	Learners will use their knowledge and understanding of research methods to conduct their own research. They will process the data they have collected and make evidence based conclusions.
Topics	3.1 Research methods
	3.2 Collecting data
	3.3 Data analysis
	3.4 Processing data
	3.5 Communicating information
Summary of assessment	This unit is internally assessed through a non-examination assessment. Learners will undertake a series of set tasks that are to be applied to a prescribed context set by WJEC and issued to centres via the WJEC Portal. This will remain for the lifetime of the specification.
	The non-examination assessment will:
	• be marked by the centre and moderated by WJEC
	• consist of 5 hours + 10 days for data collection
	• assess content from each topic and each section in the unit
	• include 80 marks
	• only use the command words listed in the Assessment Guide
	• be graded a-e.

3.1 Research methods

In this topic learners will gain knowledge and understanding of the following areas:

3.1.1 Variables affecting research

3.1.2 Research hypotheses

3.1.3 Sampling methods

3.1.4 Research methods

3.1.5 Ethical issues affecting research

Content

Section	Amplification
3.1.1 Variables affecting research	Learners should understand: • variables (independent variables, dependent variables) • extraneous variables.
3.1.2 Research hypotheses	Learners should understand: • null hypotheses • alternative hypotheses • one-tailed (directional) hypotheses • two-tailed (non-directional) hypotheses. Learners should be able to explain why the research is necessary.
3.1.3 Sampling methods	Learners should understand: • target population and sample • random sampling • snowball sampling • opportunity sampling • self-selected sampling.
3.1.4 Research methods	Learners should understand: • quantitative methods • qualitative methods. Learners should be able to justify: • the relevance to research question and hypothesis • the type of information required.

3.1.5 Ethical issues affecting research	Learners should be able to undertake an ethical review of research and methods. Learners should be able to evaluate: - social/scientific value - care and protection of research participants - confidentiality - informed consent - working with vulnerable individuals (including children). Learners should understand health review committees.

3.2 Collecting data

In this topic learners will gain knowledge and understanding of the following areas:
3.2.1 Planning to collect data
3.2.2 Producing documentation to collect data
3.2.3 Obtaining raw data

Content

Section	Amplification
3.2.1 Planning to collect data	Learners should understand procedures for collecting the following data: - quantitative - qualitative. Learners should be able to plan the collection of data by considering: - sequencing - timing.
3.2.2 Producing documentation to collect data	Learners should be able to consider: - appropriate documentation for data collection (e.g. questionnaires, interviewer documentation) - clarity - suitability and relevance for purpose.
3.2.3 Obtaining raw data	Learners should be able to obtain data that is: - suitable - sufficient.

3.3 Data analysis
In this topic learners will gain knowledge and understanding of the following areas: 3.3.1 Understanding terms used in data analysis 3.3.2 Statistical methods used to analyse data

Content	
Section	**Amplification**
3.3.1 Understanding terms used in data analysis	Learners should understand the significance of the following terms: • reliability (internal reliability, external reliability) • validity (internal validity, external validity) • bias (including researcher/observer bias) • confidence limits • significance levels.
3.3.2 Statistical methods used to analyse data	Learners should be able to use the following statistical methods: • average (mode, median, mean) • percentage • range of spread around the mean (standard deviation) • inferential statistics including chi-square. Learners should be able to explain: • data type and methodology • sampling method and size.

3.4 Processing data

In this topic learners will gain knowledge and understanding of the following areas:

3.4.1 Analysing data using statistical methods
3.4.2 Making conclusions from data
3.4.3 Evaluating procedures
3.4.4 Displaying data

Content

Section	Amplification
3.4.1 Analysing data using statistical methods	Learners should be able to analysis data using the following statistical methods: • mean, mode, median • range and standard deviation • t-test • chi-square • null hypotheses • probability • significance levels • confidence limits Learners should be able to apply the methods: • appropriately • accurately.
3.4.2 Making conclusions from data	Learners should be able to make conclusions based upon data/data analysis.
3.4.3 Evaluating procedures	Learners should be able to evaluate procedures in terms of: • sufficiency, suitability, quality data produced (e.g. validity etc) • limitations of data • cost, time, effectiveness. Learners should be able to make suggestions for improvement.
3.4.4 Displaying data	Learners should be able to use spreadsheets to carry out calculations and statistical tests. Learners should be able to create spreadsheets that are: • formatted to display data correctly • correctly labelled. Learners should be able to use the following mathematical notation: • ratios, percentages, fractions • symbols: $=, <, \ll, \gg, >, \propto, \sim$ • significant figures.

3.5 Communicating information

In this topic learners will gain knowledge and understanding of the following areas:

3.5.1 Presenting data visually

3.5.2 Communicating outcomes of research

Content	
Section	**Amplification**

3.5.1
Presenting data visually
	Learners should be able to present data using the following visual methods:
	• tables
	• graphs
	   • line graphs
	   • pie charts
	   • bar charts
	   • histograms
	   • scatter diagrams.

3.5.2 Communicating outcomes of research	Learners should be able to communicate the outcome of research to: • individual customers (scientifically literate, basic scientific understanding) • groups (scientifically literate, basic scientific understanding). Learners should consider using: • clarity • appropriate language style • accurate spelling, punctuation and grammar • appropriate language including technical and scientific • evidence based information • relevant information for the customer.

Unit 4

Unit title	Medicines and treatment of disease
GLH	70
Context	Medicines are the most common therapeutic intervention in healthcare. How are medicines used to treat diseases? How do medicines work? What are the possible side effects? Do medicines have the same effect on all patients? Can medicines lose their effectiveness? What needs to be considered when medicines are prescribed? What is cancer and how is it treated? What role do genes and mutation play in cancer? These are some of the questions that this unit is intended to answer. The pharmaceutical industry is the UK's top research sector. One-quarter of the world's top medicines were developed in the UK. The pharmaceutical industry spends around £8.8 billion on UK research and development and employs around 26,000 people. A further 250,000 people work in related industries. The past twenty years has seen an unprecedented increase in both the number and in the range of activity of drugs used in the treatment of human disease. For medicines and treatments to be most effective, those responsible for prescribing and administering them, as well as patients themselves, need advice and information. This unit focuses on providing information and advice on medicines and treatment. In this unit learners will consider the basic science of pharmacology, i.e. the study of medicine action combined with an added focus on the application to the real world - i.e. what medicines are used in the treatment of what disorders and diseases. Learners will also learn about cancer, what it is and the combination of therapeutic interventions that may be used, which include medicines but may also include new and developing therapies as more is understood about the disease.

Overview of unit	This unit develops knowledge and understanding about the science of medicines, and how they work through their interactions with body systems. It also introduces cancer, its relationship to genetics, and the range of therapeutic treatments available. The unit will enable learners to provide information to a range of audiences on how medicines work, to bring about effective treatment of diseases and disorders.
Topics	4.1 The management of medicine 4.2 How medicines work 4.3 The principles of the treatment of cancer 4.4 Providing information about medicines
Summary of assessment	This unit is internally assessed through a non-examination assessment. Learners will undertake a series of set tasks that are to be applied to a prescribed context set by WJEC and issued to centres via the WJEC Portal. This will remain for the lifetime of the specification. The non-examination assessment will: • be marked by the centre and moderated by WJEC • consist of 8 hours • assess content from each topic and each section in the unit • include 80 marks • only use the command words listed in the Assessment Guide • be graded a-e.

4.1 The management of medicine

In this topic learners will gain knowledge and understanding of the following areas:

4.1.1 Factors to be considered when prescribing medicines

4.1.2 Strategies to improve adherence of patients taking prescriptions

4.1.3 Comparing options for administering medicines

Content

Section	Amplification
4.1.1 Factors to be considered when prescribing medicines	Learners need to understand the following factors: - establishing an accurate diagnosis - patient history (other medicines that are already been taken) - overall benefit - side effects/risks - individual patient factors altering benefits/risks (e.g. age, impaired kidney function, pregnancy) - cost-effectiveness - patient choice.
4.1.2 Strategies to improve adherence of patients taking prescriptions	Learners should understand reasons for concordance with treatment regimes: Unintentional: - barriers outside patient control (e.g. difficulty understanding instructions). Intentional: - patient perception (e.g. beliefs about drug effectiveness, side effects, media claims) - patient motivation. Learners should understand strategies to improve adherence, such as: - advice/information provided to service users - consultation - involving patients in decision making - support.

4.1.3 Comparing options for administering medicines	Learners should understand the following administration routes:
	• oral
	• sublingual
	• rectal
	• topical (e.g. eye drops)
	• inhalation bronchodilators
	• parenteral (e.g. intravenous, intramuscular, subcutaneous injection).
	Learners should understand administration:
	• self-administration
	• healthcare specialist.
	Learners should be able to compare options by considering:
	• patient preference, comfort
	• ease of administration
	• speed of action, duration of action
	• predictability of absorption, reproducible effects, side effects
	• need to bypass hepatic metabolism
	• target of action (e.g. local eye drops in treatment of glaucoma, paracetamol in pain relief)
	• cost.

4.2 How medicines work

In this topic learners will gain knowledge and understanding of the following areas:

4.2.1 The molecular basis of the action of medicines

4.2.2 How medicines affect body systems

4.2.3 How medicines affect causative agents of infectious diseases

4.2.4 Why medicines may lose their effectiveness

4.2.5 Comparing the effects of the interaction of medicines

4.2.6 How factors affect the distribution of medicines in the body

4.2.7 How adverse reactions to medicines can occur

4.2.8 The fate of medicines in the body

Content

Section	Amplification
4.2.1 The molecular basis of the action of medicines	Learners should understand the following drug-receptor interactions: • agonists: full and partial • antagonists: competitive or irreversible • specificity: ability to combine with one particular receptor. Learners should understand possible ways in which medicines work: • action on transmitter substances • action on hormones • action on membrane transport systems • action on enzymes.
4.2.2 How medicines affect body systems	Learners should understand the following body systems: Cardiovascular & respiratory: • treatment of hypertension, angina, arrhythmias, asthma • for example: beta-blockers, vasodilator drugs, centrally acting drugs, drugs acting at cholinergic synapses, drugs acting on sympathetic nervous system, calcium antagonists, opening/blocking ion channels. Gastro-intestinal tract: • treatment of indigestion, ulcers, constipation, diarrhoea, antacids and acid secretion reducers, medicines affecting motility and secretions • for example, antacids: sodium bicarbonate, acid secretion reducers (cimetidine), mucosal strengtheners (sucralfate), anti-diarrhoeal drugs. Endocrine system: • treatment of overactive/underactive thyroid, diabetes • for example, competitive inhibitors, replacement therapy, antidiabetic agents.

4.2.3 How medicines affect causative agents of infectious diseases	Learners should understand the following causative agents: • bacterial infections • viral infections. Learners should understand the mechanisms of the causative agents: • bacterial infections (medicines that inhibit nucleic acid synthesis: e.g. sulphonamides; medicines that inhibit cell wall synthesis, e.g. penicillins; medicines that inhibit protein synthesis, e.g. chloramphenicol and erythromycin) • viral infections (medicines that stop a virus entering host cells, e.g. amantadine; medicines that inhibit nucleic acid synthesis, e.g. acyclovir).
4.2.4 Why medicines may lose their effectiveness	Learners should understand: • "loss" of receptors for drug-receptor interaction • drug "side effects" • antibiotic resistance.
4.2.5 Comparing the effects of the interaction of medicines	Learners should understand: • polypharmacy (concurrent use of multiple medications by one individual) • interactions between more than one medication or drug-food interactions. Learners should understand the following effects: Positive effects: • improves the effects of medicines (synergistic effect) e.g. use of codeine with paracetamol, combinations of drugs in the treatment of cancer • produces a new effect. Negative effects: • addiction • antagonistic effect • side effects • overdose.
4.2.6 How factors affect the distribution of medicines in the body	Learners should understand the distribution of medicine in body: • movement of medicines to and from the blood and various tissues of the body • relative proportion of medicines in the tissues. Learners should understand factors affecting distribution: • water-soluble drugs • fat-soluble drugs • ability to cross membranes • binding to proteins • accumulation in particular tissue types.

4.2.7 How adverse reactions to medicines can occur	Learners should understand the following adverse reactions: • extension of the medicines intended action • action of medicine on more than one receptor/transmitter • production of toxic metabolites (e.g. paracetamol) • immunological responses.
4.2.8 The fate of medicines in the body	Learners should understand: • metabolism: by liver, types of reaction • elimination and excretion: renal excretion, biliary excretion • importance of half-life.

4.3 The principles of the treatment of cancer

In this topic learners will gain knowledge and understanding of the following areas:

4.3.1 How cancer develops in humans

4.3.2 The genetic basis of cancer

4.3.3 Possible treatment options for cancer

4.3.4 The potential impact of new treatments for cancer

Content	
Section	**Amplification**

4.3.1
 	
How cancer develops in humans
	Learners should understand:
	• abnormal cell division
	  • alteration of cell cycle
	  • uncontrolled proliferation of cells
	• primary, secondary
	• difference between cancer cells and normal cells
	• types of cancer: carcinoma, sarcoma, leukaemia, lymphoma and melanoma.

4.3.2 The genetic basis of cancer	Learners should understand: • genes are short pieces of DNA that carry specific genetic information • gene mutations (inherited, environmental) • risk factors for mutation. Learners should understand genetics and cancer: • genetic changes (proto-oncogenes, tumour-suppressor genes and DNA-repair genes).
4.3.3 Possible treatment options for cancer	Learners should understand the following treatment options: • surgery • chemotherapy (cytotoxic drugs) • radiation therapy.
4.3.4 The potential impact of new treatments for cancer	Learners should understand the following new treatments: • targeted therapy • immunotherapy • photodynamic therapy Learners should understand the potential benefits (e.g., improved life expectancy) of treatment.

4.4 Providing information about medicines

In this topic learners will gain knowledge and understanding of the following areas:

4.4.1 Communicating information to an audience

4.4.2 Approach to communicating information

4.4.3 Working as part of a team

Content	
Section	**Amplification**
4.4.1 Communicating information to an audience	Learners should be able to use the following communication methods: • written information e.g. leaflet, website, media article • face-to-face • other (e.g. radio, podcast) • formal, informal • technical, non-technical. Learners should be able to consider: • clarity • style • level (accessibility, level of language for target audience) • structure. Learners should be able to communicate to the following audiences: • patients • medical staff.
4.4.2 Approach to communicating information	Learners should be able to justify: • audience addressed • issue(s) addressed • suitability of approach.
4.4.3 Working as part of a team	Learners should be able to demonstrate: • flexibility • reliability • taking responsibility • positive relationships • contributing to the team • listening to viewpoints • treating others in a respective and supportive manner • making constructive contributions.

Unit 5

Unit title	Clinical laboratory techniques
GLH	60
Context	What measurements do biomedical scientists carry out on patient samples? How do they carry out these tests? How do they ensure that they work safely and avoid contamination? How do they interpret their data? How do they report their data in a suitable format for health professionals to draw conclusions? Laboratory measurement plays a very important role in the diagnosis and treatment of patients in a range of clinical settings. These measurements may involve simple biochemical tests, microscopy or microbiology, or they may be more complicated, using the polymerase chain reaction (PCR) or Enzyme-linked immunosorbent assay (ELISA). Following these laboratory measurements, healthcare professionals will use the results to monitor for signs of abnormality (i.e. anything that falls outside of the 'normal' range). Health professionals will then be able to draw conclusions about the health status of the individual and any treatments they may require. This unit is designed to help learners understand how biomedical scientists investigate the function of body systems by undertaking laboratory-based measurements. Learners will learn how to use specialist equipment, advanced technologies and a range of different procedures. Most clinical scientists work in hospital laboratories or specialist departments, often working as a team to allow healthcare professionals to assess patient status.
Overview of unit	This unit develops knowledge and understanding about the clinical laboratory techniques that can be used to assess body functions. It relates knowledge and understanding of human physiology and biochemistry to clinical measurement test results through an understanding of the principles of the measurement techniques. The unit will enable learners to perform tests which will accurately measure a range of biochemical and microbiological parameters. They will be able to interpret the results of their tests, and other test results and link these results to possible physiological disorders.

Topics	5.1 Understanding clinical testing
	5.2 Carrying out clinical laboratory techniques
	5.3 Processing data from clinical tests
Summary of assessment	This unit is externally assessed through a non-examination assessment. Learners will undertake a series of set tasks that are to be applied to a prescribed context set annually by WJEC in the September of the academic year in which they are to be taken and issued via the WJEC Portal.

The assessment must be completed and submitted for marking in the same academic year as it is set. Centres are not allowed to modify the provided assignment for unit 5.

The assessment is carried out by the learners under controlled conditions.

Please see the page for NEA deadlines on our website (https://www.wjec.co.uk/home/administration/key-dates-and-timetables/#tab_2)

The non-examination assessment will:
- be marked by WJEC
- consist of 7 hours
- assess content from each topic and each section in the unit
- include 75 marks
- only use the command words listed in the Assessment Guide
- be graded a-e. |

5.1 Understanding clinical testing	

In this topic learners will gain knowledge and understanding of the following areas:

5.1.1 Principles of clinical tests

5.1.2 Factors that affect clinical test results

Content	
Section	**Amplification**
5.1.1 Principles of clinical tests	Learners should understand the principles of the following clinical tests: • biochemical tests e.g. simple identification tests (for reducing sugar (glucose), non-reducing sugar (sucrose), starch, protein, fats/oils, lithium ions, sodium ions, potassium ions, calcium ions copper ions, bicarbonate ions, chloride ions), simple colorimetric assays, enzyme assays (kinetic and end point), chromatography (TLC, GLC, HPLC), radioactive immunoassays (RIA), ELISA, spectrophotometry, nephelometry, turbidimetry • haematology tests e.g. red blood cell count, white blood cell count, haemoglobin, haematocrit, differential count, platelet number estimation • histopathology techniques e.g. sample preparation, microscopy (to include use of microscope scale to measure real sizes), immunohistochemistry • microbiological techniques e.g. aseptic technique, serial dilution, staining, growth of bacterial populations use of antimicrobial disks • genetic techniques e.g. use of restriction enzymes, gel electrophoresis, PCR, DNA sequencing.
5.1.2 Factors that affect clinical test results	Learners should understand how each of the following factors could affect the results of tests: • sensitivity • specificity • interfering agents • human error.

5.2 Carrying out clinical laboratory techniques

In this topic learners will gain knowledge and understanding of the following areas:

5.2.1 Planning tests
5.2.2 Assessing biological samples using clinical tests
5.2.3 Recording results from tests

Content	
Section	**Amplification**
5.2.1 Planning tests	Learners should be able to plan: • identify information required • procedures and equipment • sequencing of activities • timing.
5.2.2 Assessing biological samples using clinical tests	Learners should be able to assess the following biological samples: • blood • plasma • urine • other bodily fluids. Learners should be able to demonstrate correct use of equipment. Learners should be able to demonstrate safe working practices: • working in accordance with risk assessment and laboratory requirements • correctly using PPE • maintaining a tidy working area.
5.2.3 Recording results from tests	Learners should be able to use the following documentation: • laboratory notebook • use of proformas. Learners should be able to: • record key information • use the correct format • record data to correct precision • make legible entries.

5.3 Processing data from clinical tests

In this topic learners will gain knowledge and understanding of the following areas:

5.3.1 Using graphs to process data
5.3.2 Using numerical methods to process data
5.3.3 Interpreting data from clinical tests
5.3.4 Communicating information to an audience

Content

Section	Amplification
5.3.1 Using graphs to process data	Learners should be able to use the following graphs: • calibration curve • best-fit lines.
5.3.2 Using numerical methods to process data	Learners should be able to: • undertake manipulation of algebraic expressions • record data to the appropriate number of significant figures.
5.3.3 Interpreting data from clinical tests	Learners should be able to: • identify outliers • compare data with expected range • interpret the significance of data. Learners should understand the expected ranges of: • erythrocyte count, leucocyte count, thrombocyte count • blood glucose • plasma proteins • sodium ions, potassium ions, calcium ions.

5.3.4
Communicating information to an audience
	Learners should be able to consider:
	• audience
	  • scientifically literate audience
	  • audience with basic scientific understanding
	• information
	  • structure, clarity, style
	• language including technical and scientific
	• appropriate use of English
	• relevance of information to audience.

Unit 6

Unit title	Medical case study
GLH	50
Context	How is a case study approach used within medical and healthcare education and training? How do they provide information about a particular patient or particular scenario, which can be reviewed and assessed, so that recommendations can be made? What methods are used to collect patient data? How does patient data and case studies allow health professionals to draw conclusions? Medical case studies are useful when there is a need to obtain an in-depth appreciation of a condition or patient of interest, in a real-life context. Typically data is gathered from a variety of sources and by using several different methods. Research may also continue for an extended period of time so processes and developments can be studied as they happen. The case study method often involves simply observing what happens to, or reconstructing 'the case history' of a single participant or group of individuals (such as a school class or a specific social group). The case study is not itself a research method, but researchers select methods of data collection and analysis that will generate material suitable for case studies. In this unit learners will develop problem-solving skills through the analysis of case studies. Learners will make use of their knowledge and understanding of human physiology, physiological measurement, clinical testing, statistical research, and medical treatment including the use of medicines.
Overview of unit	This unit is the overall synoptic unit for the Extended Certificate qualification. It provides the opportunity for learners to demonstrate their understanding of the connections between the other five units of this Medical Science qualification. The content of this unit requires learners to apply skills, techniques, knowledge, understanding and concepts from across the qualification content in order to complete the required assessment. The assessment provides integrated and purposeful contexts in which candidates will demonstrate the knowledge, understanding and skills they have developed through all the other units within the qualification. The contexts provided are medical case studies, which require candidates to analyse the information provided and develop a thorough assessment of the situation based on their knowledge and understanding gained from the other units of this qualification.

Topics	6.1.1 Understanding physiological information presented within case studies
	6.1.2 Understanding how physiological measurement techniques can be used to support diagnosis and treatment
	6.1.3 Understanding how medical research can help support diagnosis and treatment
	6.1.4 Understanding ways in which medical treatments can be used to treat diseases and disorders
	6.1.5 Understanding ways in which clinical measurement techniques can be used to support diagnosis and treatment
Summary of assessment	This unit is externally assessed through a written examination available in May/June each year.
	The external assessment will:
	• be set and marked by WJEC
	• consist of a 2 hour paper
	• assess content from each topic in the unit each series
	• include 90 marks
	• include a balance of short and extended answer questions, based on stimulus material and applied contexts
	• only use the command words listed in the Assessment Guide
	• be graded a-e.
	The assessment will consist of questions based upon three different case studies. The case studies will provide a medical context for questions in this paper and will change each year. The case studies will require candidates to integrate the knowledge, understanding and skills developed through units 1 to 5. No other learning other than that gained in the specification will be examined although learners are required to be familiar with terms specified in the case study background information sheets.
	Background information relating to the case studies will be available for centres to download from the WJEC website 4 weeks before the exam.
	The information sheet for each case study will be no more than one A4 page in length.
	Teachers can use the case studies in lessons with learners after they have been released on the WJEC website.
	Candidates need to be familiar with the information in the case studies and the related specification content.

	Learners will be issued with a clean copy of the case studies for the examination. They will **not be** permitted to take an annotated copy of the case studies into the examination.
	All content in each topic area will be assessed over the lifespan of the specification. WJEC will produce a mark scheme which will be used as the basis for marking the examination papers.

Synoptic content drawn from the other five units of this Medical Science qualification

This unit requires candidates to apply skills, techniques, knowledge, understanding and concepts from the following qualification content from the previous five units:

6.1.1 Understanding physiological information presented within case studies

6.1.2 Understanding how physiological measurement techniques can be used to support diagnosis and treatment

6.1.3 Understanding how medical research can help support diagnosis and treatment

6.1.4 Understanding ways in which medical treatments can be used to treat diseases and disorders

6.1.5 Understanding ways in which clinical measurement techniques can be used to support diagnosis and treatment

Content

Section	Amplification
6.1.1 Understanding physiological information presented within case studies	Content from Unit 1.
6.1.2 Understanding how physiological measurement techniques can be used to support diagnosis and treatment	Content from Unit 2. Physiological measurements play a very important role in the diagnosis and treatment of patients in a range of clinical settings. This will require candidates to draw on their knowledge of the principles and purpose of different physiological measurement tests, as well as their understanding of how tests are performed and the relevance of results that are generated.
6.1.3 Understanding how medical research can help support diagnosis and treatment	Content from Unit 3.

6.1.4 Understanding ways in which medical treatments can be used to treat diseases and disorders	Content from Unit 4. Knowing how specific interventions, in particular medicines, can be used is an essential requirement in the successful management and treatment of disorders and disease. This will require candidates to draw on their knowledge and understanding of how medicines are managed and how they work. Candidates will also need to use their knowledge and understanding of other treatments for specific disorders such as cancer.
6.1.5 Understanding ways in which clinical measurement techniques can be used to support diagnosis and treatment	Content from Unit 5.

5. Assessment

5.1. Assessment objectives

This qualification has four assessment objectives:

AO1 Demonstration of knowledge of content from across the specification.

AO2 Application of knowledge and understanding.

AO3 Synthesis and evaluation.

AO4 Selection, use and application of practical skills and techniques.

AO1 is only assessed in external units. AO2 and AO3 are assessed in both examined and non-examined units. AO4 is only assessed in the non-examined units.

The tables below shows the weighting of each assessment objective for each unit and for the qualification as a whole.

Unit	Qualification Weighting	Raw Marks	AO Marks		AO weighting %	
1	25%	90	AO1	38-42	AO1	42-47
			AO2	38-42	AO2	42-47
			AO3	9-11	AO3	10-12
2	12.5%	80	AO2	54	AO2	67
			AO3	12	AO3	15
			AO4	14	AO4	18
3	12.5%	80	AO2	40	AO2	50
			AO3	25	AO3	31
			AO4	15	AO4	19
4	20%	80	AO2	50	AO2	62
			AO3	23	AO3	29
			AO4	7	AO4	9
5	15%	75	AO2	42	AO2	56
			AO3	18	AO3	24
			AO4	15	AO4	20
6	15%	90	AO1	29-31	AO1	32-34
			AO2	43-47	AO2	48-52
			AO3	14-16	AO3	16-18

	AO1	AO2	AO3	AO4
Qualification weighting	15-16%	53-55%	20-21%	9%

5.2. External assessment

The following units are externally assessed:
- Unit 1 – Human health and disease (first assessment in 2026)
- Unit 5 – Clinical laboratory techniques (first assessment in 2027)
- Unit 6 – Medical case study (first assessment in 2027)

Full details of the format of the assessment can be found in the relevant unit and sample assessment materials are available from the subject page of the WJEC website (wjec.co.uk).

For external assessments, centres must follow the Joint Council for Qualifications (JCQ) *Instructions for Conducting Examinations*, a copy of which can be accessed from the JCQ website. (www.jcq.org.uk).

5.3. Internal assessment

The following units are internally assessed and submitted for external moderation (first submission in 2026):
- Unit 2 - Physiological measurement techniques
- Unit 3 - Medical Science research methods

The following unit is internally assessed and submitted for external moderation (first submission in 2027):
- Unit 4 - Medicines and treatment of disease

Full details of the format of the assessment can be found in the relevant unit and sample assessment materials are available from the subject page of the WJEC website (wjec.co.uk).
Candidate and Assessor Assessment Packs are available on the WJEC Portal (Portal by WJEC) for centres to download from the first Monday in September each year.

Centres have flexibility in when they schedule internal assessment but must ensure that they are using the correct packs for the series in which they intend to enter the work for moderation. Candidates must **not** have access to the Candidate Packs until they start their assessment which should be after all the teaching and learning for the unit has been completed.

For internal assessments, centres must follow the procedures for managing non-examination assessments published in the WJEC Applied Qualifications (including Alternative Academic Qualifications): Assessment Guide, a copy of which can be accessed from the subject pages of our websites. In line with these instructions, centres are required to have in place a non-examination assessment policy for WJEC applied qualifications (which can be part of a centre's broader NEA policy).

5.4. Managing suspected Malpractice

Information regarding malpractice is available in our **Malpractice, A Guide for Centres** document.

All cases of suspected or actual malpractice must be reported to WJEC. If candidates commit malpractice, they may be penalised or disqualified from the examinations.

In all cases of malpractice, centres are advised to consult the JCQ booklet **Suspected Malpractice: Policies and Procedures.**

5.5. Preventing candidate malpractice

Candidates must not:
- submit work which is not their own
- make available their work to other candidates through any medium
- allow other candidates to have access to their own independently sourced material
- assist other candidates to produce work
- use books, the internet or other sources without acknowledgement or attribution
- submit work that has been word processed by a third party without acknowledgement
- include inappropriate, offensive or obscene material.

Candidates are not prohibited from lending books or other resources to one another, but they must not plagiarise others' research.

Candidates must not post their work on social media. They should be made aware of the JCQ document Information for candidates – Guidelines when referring to examinations/assessments through the Internet – https://www.jcq.org.uk/wp-content/uploads/2021/08/IFC-NE_Assessments_2021_v4.pdfht

Heads of centre and senior leaders must ensure that those members of teaching staff involved in the direct supervision of candidates producing non-examination assessment are aware of the potential for malpractice.

Teaching staff must be reminded that failure to report allegations of malpractice or suspected malpractice constitutes malpractice itself.

Teaching staff must:
- be vigilant in relation to candidate malpractice and be fully aware of the published regulations
- report any alleged, suspected or actual incidents of malpractice to the senior leadership team or directly to WJEC.

6. Delivering the qualification

6.1. Centre approval

In order to offer our qualifications, centres must have WJEC centre approval. The approval process involves completion of the relevant application form(s) and an assessment of the ability of the centre to meet WJEC and relevant JCQ requirements.

If your centre wishes to submit entries and is not yet registered as a centre, please contact the Centre Support department at WJEC (centres@WJEC.co.uk) for an application form. The completed form must be returned to WJEC no less than five months prior to the relevant entry deadline.

WJEC approved centres must adhere to the **General Conditions for WJEC Centres** and the appropriate **JCQ regulations.** All WJEC approved centres with a national centre number (NCN) must complete the **annual declaration sent by NCN**. Failure to do so will result in suspension of WJEC registration.

6.2. Unit entry

Entry for individual units must be made by submitting the relevant unit codes as indicated below.

		Entry Code	
		English medium	Welsh medium
Unit 1 Human health and disease	External assessment - onscreen	4403UA	4403NA
	External assessment - paper	4403UB	4403NB
Unit 2 Physiological measurement techniques	Internal assessment	4403U2	4403N2
Unit 3 Medical Science research methods	Internal assessment	4403U3	4403N3
Unit 4 Medicines and treatment of disease	Internal assessment	4403U4	4403N4
Unit 5 Clinical laboratory techniques	External assessment	4403U5	4403N5
Unit 6 Medical case study	External assessment - onscreen	4403UC	4403NC
	External assessment - paper	4403UD	4403ND

6.3. Resitting units

Internally assessed units

Marks for internal non-examination assessments may be carried forward for the life of the qualification.
If a candidate chooses to resit an internal non-examination assessment (rather than carrying forward the previous mark), it is the higher mark that will contribute to the overall qualification grade awarded.

Candidates resitting a unit cannot re-submit evidence for assessment that has been entered previously. If a candidate chooses to resit a unit, they must undertake a new assessment based on the stimuli released for the series in which the resit takes place.

Resits must be completed within the same levels of control as specified for the assessment.

If a candidate has been entered for an internal, non-examination assessment but is marked absent (a), the absence does not count as an attempt.

If a candidate is recorded as being awarded '0' marks, then it will be assumed that the evidence generated for assessment was not worthy of credit; this will be counted as an attempt.

Externally assessed units

Learners will be allowed two resits for each external examination with the higher grade contributing to the overall qualification grade awarded.

If a candidate has been entered but is absent for an external examination, the absence does not count as an attempt.

If a candidate wishes to sit one or more external examinations for a fourth time, the candidate must retake all external assessments; this is referred to as a 'fresh start'. When retaking the external assessments, a candidate may have up to three attempts at each external assessment. However, no results from external assessments completed prior to the fresh start can be used in aggregating the new grade(s).

As set out above, marks for internal non-examination assessments may be carried forward for the life of the qualification and therefore learners will not be required to resit internal non-examination assessments if they trigger the fresh start rule.

6.4. Qualification entry

Learners will be entered for the qualification when entering for aggregation (cash-in). The qualification will be available for certification in the summer assessment series from 2027 onwards.

Aggregation does not take place automatically; it is necessary to enter the relevant code for aggregation to take place.

	Cash in Code	
	English medium	Welsh medium
Level 3 Alternative Academic Qualification in Medical Science (Applied Extended Certificate)	4403QX	4403CX

7. Awarding, grading and reporting

7.1. Unit grades

Units within the qualification are awarded on a five-point scale a-e.

Individual units are recorded on a uniform mark scale (UMS) with the following grade equivalences:

	Max	a	b	c	d	e
Unit 1	200	160	140	120	100	80
Unit 2	100	80	70	60	50	40
Unit 3	100	80	70	60	50	40
Unit 4	160	128	112	96	80	64
Unit 5	120	96	84	72	60	48
Unit 6	120	96	84	72	60	48

7.2. Qualification grade

The qualification is awarded on a six-point scale A*-E.

The uniform marks obtained for each unit are added up and the qualification grade is based on this total.

Max	A*	A	B	C	D	E
800	640	560	480	400	320	240

Candidates who do not achieve the minimum uniform marks required to achieve an E will have their achievement recorded as U (unclassified) and will not receive a certificate.

7.3. Post-results services

Following the publication of results for each examination series, WJEC offers a range of post-results services relating to reviews of marking and moderation and access to examination scripts. Information on post-results services can be found on the WJEC website.